

Air Toxics Emission Inventories and Monitoring In Hillsborough County, Florida

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ABSTRACT

The following paper describes the problems encountered in developing a complete air toxics program at a local environmental program, including inventorying air toxics and monitoring for air toxics. It includes the steps in developing a complete toxics inventory, how the information was gathered, and how it was used. It also indicates how the inventory played an important part in the implementation of an air toxics monitoring program. Finally, it compares the results of the air monitoring against EPA's just released National Air Toxics Assessment for 1996.

INTRODUCTION

In 1996, the local environmental program in Tampa, Florida, like many programs, was just getting started in dealing with the renewed emphasis on air toxics created by the 1990 Clean Air Act Amendments. An outreach program was already in place to identify facilities that might be subject to the new regulations EPA was developing, however, one of the areas lacking was any information on what toxic air pollutants were in the local air shed. But, like many other programs, resource limitations, and a limited database of similar programs presented obstacles to the development of a well-rounded program. The following represents what one local program did to overcome those obstacles.

DISCUSSION

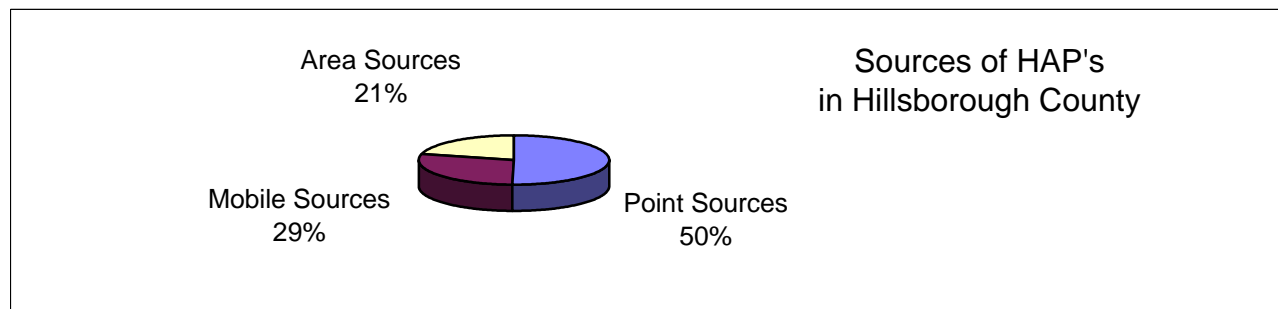
In 1996, when I first became the supervisor for the air toxics program at the Environmental Protection Commission (EPC) of Hillsborough County, Florida, one of the first things that I noted was a complete lack of information on what toxics might be in the air in Hillsborough County. There was no toxics inventory and we were not monitoring for air toxics. One of the most fundamental tenets of any program is to know how big the problem is you are trying to solve.

The cheapest and most logical place to start in my mind was to inventory air toxics. So, we started to inventory Hazardous Air Pollutants (HAP's) in 1996 with the point sources. Our local program already required most of the significant point sources in the County to submit Annual Operating Report (AOR) information, although most of it was criteria pollutant information, and contained very little HAP information. But, by using the throughput information in the AOR's, we could go to sources such as AP-42 for HAP emission factors, and calculate the HAP emissions. For example, AP-42 had over 60 HAP emission factors for the combustion of coal at two power plants in our county. And, with the HAP calculations for the power plants, we accounted for over 70% of the point source emissions of HAP's in the County. Some of the other sources required a little more work, because they did not submit AOR's. But, by reviewing permitting information, we were able to come up with a good estimate of their emissions. Also, because of the almost total lack of stack testing for HAP's, we had to access other sources of emission factors, such as MSDS sheets. One thing we did, which made the job easier in subsequent years, was to create computerized spreadsheets for each company, arranged in a format that allowed easy entry of the information into the State's computer database. Thereafter, it was simply a matter of entering the current years throughput information, and checking the emission factors to see if they have been updated or if the facility had conducted a stack test. We have continued to inventory point sources for HAP's each year since

then. Although not required to, we started to enter the HAP emissions information into the State's database in 1999. The State uploads the database information to EPA's AIRS database, so the information became available to EPA for use in its National Toxics Inventory (NTI) efforts. Our initial inventory of point sources only, indicated that there was 5,646 tons of toxic air pollutants emitted into the air over Hillsborough County in 1996. Because of the way the State processes the AOR's, one unexpected benefit of entering the HAP's information in the State's database has been the submission of better HAP data from the facilities themselves in their AOR's.

Although we had started to inventory HAP's, I knew we were missing two-thirds of the emission sources, the area and mobile sources. We took advantage of a requirement to conduct an Ozone Maintenance Inventory in 1997 to expand the HAP inventory to add area sources and mobile sources. The Ozone Maintenance Inventory required us to collect throughput information for the area and mobile sources, so it was simply a matter of applying HAP emission factors to calculate those emissions. I say simply, but it was a challenge to find HAP emission factors for area and mobile sources. Very few agencies were conducting HAP inventories and very little information was available for these categories. We did the best we could, including using some crude HAP emission factors for that first inventory. But the end result did give us a better feel for overall HAP emissions in the County (figure 1). Our more comprehensive 1997 HAP inventory indicated that there was 14,286 tons of HAP's emitted; 7,176 tons from point sources, 4,079 tons from mobile sources, and 3,031 tons from area sources. Again, we entered the information into computerized spreadsheets and kept information as to where the emission factors came from for future reference. Because of the extra effort required and the lack of resources, we decided to inventory area and mobile sources every three years, when we are required to conduct the Ozone Maintenance Inventory.

Figure 1. Sources of HAP's in Hillsborough County.



The whole process of developing HAP inventories for point, area, and mobile made me keenly aware of the lack of good emission factor information for toxics and led me to seek and encourage the consolidation of this type of information, both at the State and Federal levels. While AP-42, FIRE, the Emission Inventory Improvement Program (EIIP), and other sources have some HAP emission factors, all these sources need to be expanded and updated with HAP emission factors as soon as they become available. Local, State and Federal programs nationwide need to share stack testing information on HAP's as it becomes available, as this is ultimately the best source of HAP emission factors, and no one program will have access to all this type of information.

One of the first benefits to come from our efforts came during the Cumulative Exposure Project (CEP) by EPA. EPA had conducted a National Toxics Inventory (NTI) based on 1990 emissions and used the results to model average HAP concentrations all the way down to the census tract level. But the way EPA calculated the NTI emissions, generally by calculating national emissions and assigning them to counties based on population or SIC codes, differed in some areas from the way we conducted our inventory. Local programs generally have better access to throughput information and a better grasp of what facilities are doing in their area than EPA. Our inventory allowed us to review EPA's results, determine which areas needed further resolution, and provide that input to EPA. Another task we accomplished, as part of the

1997 inventory, was to identify what types of sources were the major contributors to different types of HAP's. With our inventory, we were able to answer questions as to where the emissions might be coming from (figure 2). The CEP was never officially released to the public as originally planned, but we were ready if it was.

Figure 2. Sources of HAP Emissions in 1997 Inventory.

Sources of HAP Emissions in 1997 Inventory	
* 96 % of Point Source Emissions were from two sources:	
- 74 % from power plants.	
- 22 % from waste incinerators.	
* 86 % of Mobile Source Emissions were from on-road vehicles.	
* 89 % of Area Source Emissions were from two sources:	
- 61 % from solvent usage.	
- 28 % from burning (primarily commercial land clearing).	

Another benefit came with toxics monitoring. To build a more complete toxics program, I knew we needed to pursue toxics monitoring, and the inventory gave me an idea what we should try to monitor for. The hard part with monitoring is procuring funding and just getting started. We were just discussing cooperative efforts with the local program in the county on the other side of Tampa Bay, Pinellas County, which was already conducting toxics monitoring, when EPA announced the availability of funds for specialized toxics monitoring, the Urban Air Toxics Pilot Monitoring Program. In cooperation with Pinellas County, we applied for and were awarded one year's worth of funding to conduct this monitoring in the Tampa Bay area. Of note, one of the selection criteria for this program was the availability of a HAP emissions inventory, which we had. One of the stated objectives of this pilot-monitoring program is to assist in the design of a national air toxics monitoring network in the future.

We started monitoring at six sites, three in Hillsborough County and three in Pinellas County, January 1, 2001. EPA specified 18 pollutants from its Urban Air Toxics (UAT) list to be included in this monitoring. Because of the additional capacity of the methods employed, we are actually monitoring for 62 compounds: 40 volatile organic compounds, including 29 HAP's of which 13 are UAT; 12 Carbonyls, including 3 HAP's of which 2 are UAT; and 10 metals, all HAP's, but only 7 are UAT. Of note, we were able to minimize the costs of the program by pooling the laboratory resources of the two counties involved. Pinellas County's lab analyzes the VOC's collected by both counties and Hillsborough County's lab analyzes the metals for both counties.

Now we have actual monitoring data to compare against our inventory. Another step we have taken is to compare the inventory and monitoring data against health benchmarks to determine if we have any high levels in the area. Furthermore, we have our inventory and monitoring data to compare against EPA's National Air Toxics Assessment (NATA)(figure 3). The NATA goes one step beyond its predecessor, the CEP, by running the modeled HAP concentrations through a human exposure model to estimate the risk posed by the HAP concentrations. Because of our inventory and monitoring efforts, we are better prepared to address any questions that might arise from the public release of the NATA results.

Figure 3. Comparison of NATA results versus Air Monitoring in Hillsborough County.

NATA vs Monitoring in Hillsborough County, FL

- * Of 33 NATA compounds, 22 were monitored in 2001.
- * NATA modeling indicated 12 exceeded health benchmarks.
 - Of the 12:
 - 10 were monitored for by Hillsborough County.
 - 2 were not monitored.
- * Of 22 monitored in 2001:
 - 16 exceeded health benchmarks.
 - 6 which exceeded on monitors were not predicted to exceed by NATA modeling.
 - 6 did not exceed health benchmarks.
 - 2 predicted by NATA to exceed, did not exceed.

CONCLUSION

Because of our air toxics inventories, which led to our air toxics monitoring, we now have a much better idea of the toxics emissions in the air over Hillsborough County. Our inventories tell that we should be monitoring for some additional HAP's, but we are constrained by a lack of funding. We have continued to update our inventories, including a comprehensive inventory of point, area, and mobile sources in 2000. We have also continued to refine the inventory by using the latest emission factors available, including the same emission factors EPA used in its 1996 NTI. Also, since we started inventorying area sources, we have paid more attention to these sources when we conduct inspections. We have made it a point to try to collect throughput information from area sources that we can in turn use to improve our inventories.

Now that we have a good start on inventorying HAP's, our future plans include: continuing to conduct toxics monitoring as funding allows; and continuing to inventory HAP's; to refine our knowledge of what is in the air, to assist in the national air toxics assessment efforts, to assist EPA in its rule development efforts, to help us set our priorities in our local air toxics program, and to use the results to quantify any reductions in HAP emissions in Hillsborough County.